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Investigation of gain characteristics in mixed crystals LiMeF4 (Me = Y, Lu, Yb) doped by Ce3+ ions

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Abstract

Differential gain spectra in the range 295-335 nm were measured in crystals of scheelite structure LiY1 - x Lu x F4 (x = 0-1), doped by Ce3+ ions. It is shown that variation of Lu 3+ and Y3+ ions relative content in LiY1 - x Lu x F4 crystals allows to manipulate the spectral width of the amplification band. Cross-sections of excited-state absorption at the wavelengths of Ce3+ luminescence, probability ratios of formation and thermal destruction of color centers depending on the Y3+ ions content in LiY1 - x Lu x F4 crystals were estimated. Even better gain characteristics have been demonstrated by LiLuF 4:Ce3+, doped by Yb3+ ions. The highest optical gain coefficient with a wide amplification band among studied samples was observed in LiLuF4:Ce3+ crystal, codoped by Yb 3+ ions.

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